MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00016

R10452767

Project	***RPP-WTP***	P&ID	***24590-PTF-M6-PWD-P0003, 24590-PTF-M6-PWD-P0024/25*** 3
Project No	***24590***	Process Calculation	***Deleted***
Project Site	***Hanford***	Vessel Drawing	***24590-PTF-MV-PWD-P0006*** ISSUED BY RPP-WTP PDC
Description	***Acidic/Alkaline Effluent Vessel***		

Reference Data

Charge Vessels (Tag Numbers)	***PWD-VSL-00111, PWD-VSL-00112, PWD-VSL-000113, PWD-VSL-00114, PWD-VSL-00115***
Pulsejet Mixers / Agitators (Tag Numbers)	***PWD-PJM-00011, PWD-PJM-00012, PWD-PJM-00013, PWD-PJM-00014, PWD-PJM-00015, PWD-PJM-00016, PWD-PJM-00017, PWD-PJM-00018***
RFDs/Pumps (Tag Numbers)	***PWD-RFD-00111, PWD-RFD-00112, PWD-RFD-00113, PWD-RFD-00114, PWD-RFD-00115***

Design Data

Quality Level		***QL-1***	Fabrication Specs	***24590-WTP-3PS-MV00-TP001***		
Seismic Category		***SC-I***	Design Code	***ASME VIII Div 1***		
Service/Contents		***Radioactive Liquid***	Code Stamp	***Yes***		
Design Specific Gravity		***1.52***	NB Registration	***Yes***		
Operating Volume	gal	***105,850***	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	***119,150***	Estimated	***281,000***	***1,640,000***	***1,285,000***
			Actual *			

Inside Diameter	inch	***264***			Wind Design	***Not Required***	
Length/Height (TL-TL)	inch	***415***			Snow Design	***Not Required***	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	***24590-WTP-3PS-SS90-T0001 24590-WTP-3PS-MV00-TP002***	
Internal Pressure	psig	***Atm***	***15***	***N/A***	Seismic Base Moment *	ft*lb	
External Pressure	psig	***0.22***	***10***	***N/A***	Postweld Heat Treat	***Not Required***	
Temperature	°F	***212***	***237***	***N/A***	Corrosion Allowance	Inch	***0.08 (Notes 7, 8)***
Min. Design Metal Temp.	°F	***0***			Hydrostatic Test Pressure*	Psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

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This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
3	12/29/04	Issued for Permitting Use				
2	11/17/04	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	2/24/04	Issued for Permitting Use	J. Jackson	S. Suharto	C. Slater	M. Hoffmann
0	09/17/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

Materials of Construction

Component	Material	Minimum Thickness/Size	Containment
Top Head	***SA 240 316 with max. Carbon of 0.030%***	***See Drawing***	***Auxiliary (Note 1)***
Shell	***SA 240 316 with max. Carbon of 0.030%***	***See Drawing***	***Primary (Note 1)***
Bottom Head	***SA 240 316 with max. Carbon of 0.030%***	***See Drawing***	***Primary (Note 1)***
Support	***SA 240 304 with max. Carbon of 0.030%***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA240 316 with max. Carbon of 0.030%***	***See Drawing***	***Thermowell Primary (Note 1)***
Pipe	***SA312 TP316 Smls with max. Carbon of 0.030%***	***See Drawing***	***See Note 1***
Forgings/ Bar stock	***SA182 F316/SA479 316 with max. Carbon of 0.030%***	***See Drawing***	***As Note 1 for Nozzle Necks***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

Orientation	***Vertical***	Support Type	***Skirt***
Insulation Function	***Not Applicable***	Insulation Material	***Not Applicable***
Insulation Thickness (inch)	***Not Applicable***	Weld Surface Finish	***De-scaled as laid***

Remarks

* To be determined by the vendor.

Note 1: ***All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.***

Note 2: ***Radiography for this vessel shall be per para. 6.2 of specification 24590-WTP-3PS-MV00-TP001. Nozzle repads shall not be used.***

Note 3: ***Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals***

Note 4: ***Contents of this document are Dangerous Waste Permit affecting***

Note 5: ***This vessel is located in a Black Cell.***

Note 6: ***Deleted.***

Note 7: ***BNI shall ensure that an additional 0.077" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.*** △3

Note 8: ***BNI shall ensure that an additional 0.054" is available for erosion in the interior conical surface of the pulse jet mixers.*** △3

Note 9 ***All Hydrodynamic loads are for BNI internal use and are to be disregarded by the seller.*** △3

Equipment Cyclic Data Sheet

Plant Item Number	*24590-PTF-MV-PWD-VSL-00016*
Component Description	*Parent Vessel*

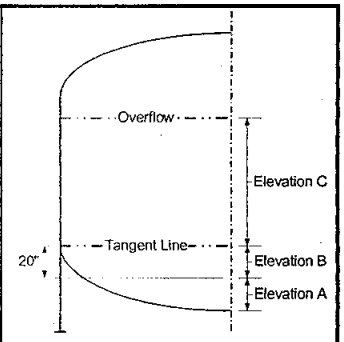
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*This is a "batch" vessel and cycle from nearly empty to nearly full every six days.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-0.22*	*0.00*	*2,450*	
Operating Temperature	°F	*59*	*212*	*2,450*	*Uniform material temperature range, not between two points*
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*2,450*	*Coincident with pressure cycles*
Localized Features					
Nozzles		*Within 50°F of vessel operating range*		*As above*	

Hydrodynamic Loading

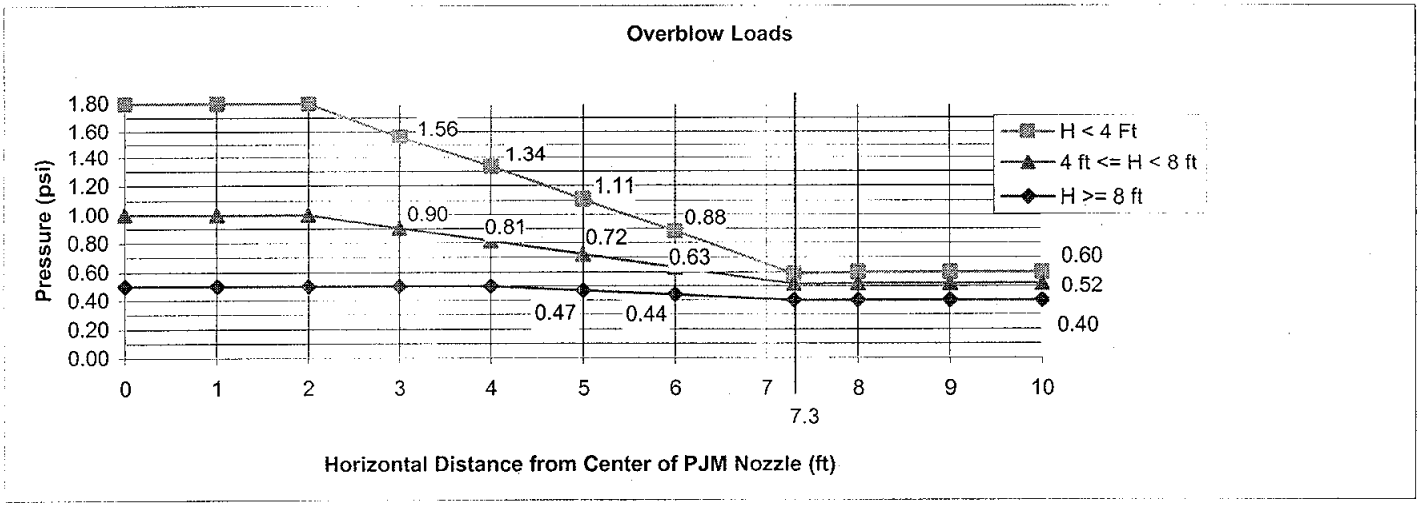
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	*-0.15 to 0.15*	*-0.05 to 0.12*	*-0.15 to 0.15*	*-0.03 to 0.05*	*-0.06 to 0.15*	*14.1×10^6*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Equipment Cyclic Data Sheet

Plant Item Number	*PWD-VSL-00111, PWD-VSL-00112, PWD-VSL-000113, PWD-VSL-00114, PWD-VSL-00115, ~~PWD-VSL-00116~~* 3
Component Description	*Charge Vessels*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*55*	*10*	***Nominal assumption***
Operating Pressure	psig	*FV*	*30*	*391,000*	
Operating Temperature	°F	*59*	*212*	*2,450*	***Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.***
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*391,000*	***Coincident with pressure cycles***
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Equipment Cyclic Data Sheet

Plant Item Number	*PWD-PJM-00011, PWD-PJM-00012, PWD-PJM-00013, PWD-PJM-00014, PWD-PJM-00015, PWD-PJM-00016, PWD-PJM-00017, PWD-PJM-00018*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	***These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) in addition to thrust.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*85*	*10*	***Nominal assumption***
Operating Pressure	psig	*FV*	*60*	*14.1×10^6*	
Operating Temperature	°F	*59*	*212*	*14.1×10^6*	***Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.***
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*14.1×10^6*	***Coincident with pressure cycles***
Thrust	lbf	*0*	*280*	*14.1×10^6*	
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***